Screening of Chickpea Cultivars against Ascochyta Blight in Himachal Pradesh,

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Chickpea is attacked by several serious diseases. Among these, blight caused by *Ascochyta rabiei* (Pass.) Lab. is important in northern states of India. In the present study, screening of 75 germplasm/lines (desi types) against ascochyta blight was under taken to study disease reactions of different lines under field conditions. Chickpea was sown in a randomized-block design with two replications at Berthin Research Substation of Himachal Pradesh Krishi Vishwavidyalaya, during 1988/89 and 1989/90, under rainfed conditions. The rainfall recorded was 17.6 mm in February and 65.8 mm in March during 1988/89, and during 1989/90 the rainfall was 122.8 mm in February and 142.8 mm in March. The overall climatic conditions during the postrainy season 1989/90 were quite conducive for the disease development. Disease incidence was recorded on a 1-9 scale at 75% maturity stage.

None of the varieties could be rated as immune or resistant. However, some of the lines were observed to be moderately resistant or tolerant, which are given below:

Moderately resistant:	GG 829, GL 86123, HPG 13, HPG 16, HPG 79, H 86-21, and PBG 1.
Tolerant:	HPG 25, HPG 39, HPG 40, HPG 41, HPG 45, HPG 69, HPG 78, HPG 86, H 75-35, H 86-100, and H 66-102.

The rest of the varieties were moderately susceptible to highly susceptible.

Some Histopathological Observations of Chickpea Roots Infected by *Rhizoctonia bataticola*

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Dry root rot caused by *Rhizoctonia bataticola* (Taubl.) Butler is a serious disease of chickpea grown in semi-arid regions of the world (Nene et al. 1989). Continuous black discoloration of pith and xylem vessels of the roots and basal shoots is one of the main characteristic symptom of wilt (Nene et al. 1978). We observed that chickpea plants [illegible] to black discoloration of the pith and xylem vessels in advanced stages of infection.

We have carried out investigations to find out whether intraxylem infection of *R. bataticola* occurs in chickpea.

Rhizoctonia bataticola multiplied for 2 weeks on sand culture medium (sand 90 g; chickpea granules 10 g; 10 mL 1% peptone; 10 mL 1% sucrose in distilled water) was mixed with sand (1:2) in 15 cm plastic pots prior to sowing with a susceptible chickpea cultivar BG 212. The plants showing stunting, chlorosis, and drying of lower leaves 45 days after inoculation were removed from the pots and used for histopathological investigations. Healthy noninoculated plants of same age and cultivar were used for comparison. About 1-cm long pieces of roots from both *R. bataticola* infected and noninoculated plants were fixed in 3% glutaraldehyde for 48 h. The microtechnique method of Feder and O'Brien (1968) was used for dehydration and embedding. Longitudinal and transverse serial sections of 2 to 4 µ thickness were cut and stained with 3% toluidine blue.

Upon microscopic examination, *R. bataticola* inoculated roots showed disintegration of cortical tissues. In addition, mycelium and sclerotial bodies of *R. bataticola* plugging xylem vessels were observed in longitudinal sections (Figs. 1 and 2).

Though chickpea plants get infected with *R. bataticola* in the seedling stage, they may not die until maturity in field. The extent of root necrosis gradually increases with time without any apparent symptoms on the parts

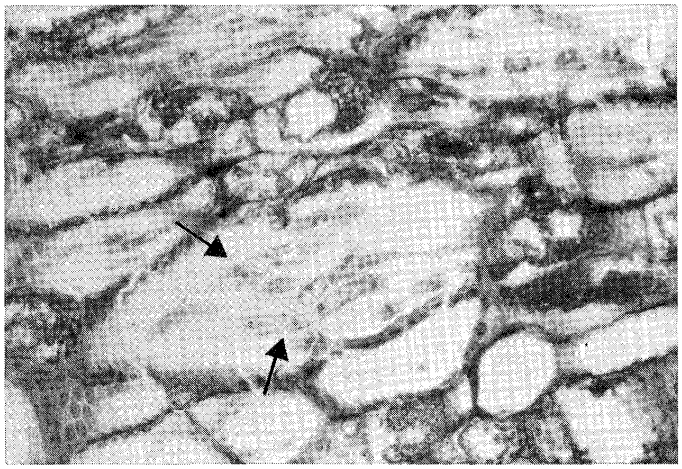

Figure 1. Photomicrograph of dry root rot (*R. bataticola*) infected chickpea roots. LS showing intraxylem mycelium.

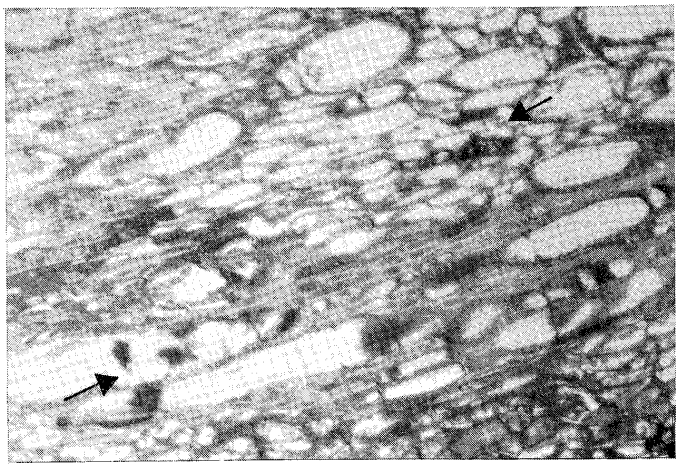

Figure 2. Photomicrograph of dry root rot (*R. bataticola*) infected chickpea roots. LS showing intraxylem sclerotial bodies.

above the ground till flowering and podding. The infected plants of susceptible cultivars suddenly collapse at the pod-filling stage. This sudden collapse could be because of plugging of the xylem vessels by mycelium and sclerotial bodies of *R. bataticola.* This type of sudden death also occurs because of wilt in susceptible varieties within a month after sowing. But many tolerant cultivars survive in the field with extensive blackening of xylem and die at a later stage. Thus in the field it is difficult to identify late wilt and dry root rot based on xylem discoloration alone. In case of dry root rot, it seems most logical to conclude that reduction in the mass of functional roots in an infected plant contributes to sudden wilting, particularly in postflowering stage, which coincides with the increase in daytime ambient temperatures.

This is the first study in which intraxylem mycelium and sclerotial bodies of *R. bataticola* were found in dry root-rot infected chickpeas and their possible role in sudden death of plants implicated.

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Effect of Age on Susceptibility of Chickpea to *Rhizoctonia bataticola*

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Rhizoctonia bataticola (Taubl.) Butler [*Macrophomina phaseolina* (Tassi) Goid.] is one of the most destructive pathogen of crops in the tropics and subtropics (Ghaffar et al. 1964). Dry root rot caused by *R. bataticola* is a serious disease of chickpea grown in the semi-arid regions (Nene et al. 1989).

The damage because of dry root rot in chickpea is more severe at flowering and podding stages than at seedling stage. Evaluation of many chickpea germplasm and breeding lines for resistance to dry root rot at ICRISAT Center, Patancheru, India, failed to reveal higher genetic resistance to the disease. Many 5-day old chickpea lines found resistant to *R. bataticola* using a blotter paper technique (Nene et al. 1981) showed susceptibility under field conditions. Therefore, experiments were conducted to find out the effect of age of chickpea on susceptibility to *R. bataticola* to select an appropriate age for screening chickpeas for resistance to the pathogen.

Five chickpea lines, i.e., BG 212, ICC 5126, ICC 6098, ICC 202, and ICC 554 were inoculated with *R. bataticola* at differing ages of 7, 15, 30, 45, 60, and 75 days, using the blotter-paper technique (Nene et al. 1981).

Table 1. Effect of age of chickpea on susceptibility to *R. bataticola* in a blotter-paper technique.

Chickpea genotype	Root necrosis on 1-9 scale[1]		
	7 days	15 days	30-75 days
BG 212	7	9	9
ICC 5726	5	7	9
ICC 6093	7	7	9
ICC 202	5	6	9
ICC 554	5	7	9

1. Each reading is average of 20 seedlings where 1 = no damage, and 9 = 100% rotting of the root.